GOVERNMENT OF INDIA
ATOMIC ENERGY
LOK SABHA

UNSTARRED QUESTION NO:274
ANSWERED ON:14.03.2012
NUCLEAR WASTE
Biju Shri P. K.

Will the Minister of ATOMIC ENERGY be pleased to state:

(a) whether the Government has assessed the quantity of nuclear waste generated by the nuclear power plants in the country;

(b) if so, the details thereof, plant-wise;

(c) whether the Government uses latest technology for disposing of the nuclear waste; and

(d) if so, the details thereof and if not, the reasons therefor?

Answer

THE MINISTER OF STATE FOR PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND PRIME MINISTER'S OFFICE (SHRI V. NARAYANASAMY):

(a) Yes, Sir.

(b) Nuclear waste is classified into high, intermediate and low levels depending on the level of radioactivity in it. The spent fuel which contains long lived radioisotopes are stored for a long period to reduce the level of radioactivity and subsequently reprocessed at reprocessing plants for collecting fissile elements. The generation of high level waste is at reprocessing plants. The quantity of this waste in our country is much smaller due to our adoption of the closed fuel cycle. High level waste generated from the reprocessing plant is vitrified into a glassy form, contained in multiple barrier containers and stored for an interim period of three to four decades in engineered vaults with necessary surveillance facilities. After cooling down in these storage facilities, waste containers will be stored for long term in deep geological repositories.

Reprocessing and Waste Management plants are currently being operated by Bhabha Atomic Research Centre (BARC).

The low and intermediate level nuclear waste containing radioactive substances with short half life are generated at nuclear power plants and are processed at the site in the following manner:

(i) The generated waste is solidified by fixing this in materials like cement, polymers, glass etc., to ensure that it does not move.

(ii) The solidified waste is then stored in specially fabricated double walled high integrity stainless steel container.

(iii) The containers containing the solidified waste are stored inside a high integrity concrete pit at each of the nuclear power plant site.

(iv) As the waste is fixed in cement, glass, polymer, it is immobilized and its placement in high integrity containers inside a pit ensures that the radioactive wastes is completely insulated from the environment.

The radioactivity level of the stored wastes reduces with time and by the end of the plant life, including decommissioning falls to normal levels.

Such facilities for handling low and intermediate level waste are located at all the nuclear power stations viz. Tarapur (Maharashtra), Rawatbhata (Rajasthan), Kalpakkam (Tamilnadu), Narora (Uttar Pradesh), Kakrapar (Gujarat) and Kaiga (Karnataka). The quantity of low and intermediate level waste to be stored at site during the life time including decommissioning is within 0.15 cubic meters/year/MW.

(c) Yes, Sir.

(d) The Government is using latest technology for disposing the nuclear waste generated during operation of nuclear power plants. The details are as follows:

(i) The low and intermediate level radioactive waste generated during operation and maintenance of nuclear power plants is segregated, its volume reduced using various technologies and solidified. This solid/solidified waste is packaged in suitable containers to facilitate handling, transport and disposal.

(ii) Disposal of low and intermediate level waste is carried out in specially constructed structures such as stone lined trenches, reinforced concrete trenches and tile holes. These disposal structures are located both above and underground in access-controlled areas. Disposal system is designed based on multi barrier principle for ensuring effective containment of the radioactivity. The areas where the disposal structures are located are kept under constant surveillance with the help of bore-wells laid out in a planned manner. The underground soil and water samples from these bore wells are routinely monitored to confirm effective confinement of radioactivity present in the disposed waste.

(iii) Gaseous waste is treated at the source of generation. The techniques used are adsorption on activated charcoal and filtration by high efficiency particulate air filters. The treated gases are then diluted with exhaust air and discharged through a tall stack with monitoring.

(iv) Liquid waste streams are treated by various techniques, such as filtration, adsorption, chemical treatment, thermal and solar evaporation, ion exchange, reverse osmosis etc. The concentrate from treatment of liquid waste are immobilized in inert materials like cement, polymer etc.

The nuclear waste handling, treatment, storage and disposal is carried out as per the well laid down procedures and guidelines stipulated by the Atomic Energy Regulatory Board (AERB).